Understanding National Park Service Soil Survey Needs

Park 1

NRCS Natural Resources Conservation Service

NATIONAL PARK SERVICE

NPS as a NCSS cooperator

- Soil mapping is part of the DOI Natural Resource Challenge – it's a one time deal
- Funding ~$2.5 - 3.0 Million/year for new mapping. Funding until the work is done – again, it's a one shot deal. NPS will not have designated funds for updating
- 32 park projects in 10 states

NPS Soil Resource Inventory Staff

Park 2

Pete Biggam - Soils Program Manager

Judy Daniels - CSU as SRI Data Manager

Branon Barrett – UCD GIS Specialist

Troy Kashon – UCD GIS Specialist

Sue Southard – NRCS/NPS Liaison

Premise we want to work under

Park 3

- Promoting the use of soils information means making it accessible in a user friendly way
- This also promotes the profession

Facts we have to acknowledge

NPS Parks have…

no resource soil scientists
no soil scientists on staff (except Pete and me)
very few GIS specialists - most have none
no plotters
very limited financial resources
no infrastructure for training in soils and existing GIS staff is spread thin

What does the NPS want for soil survey deliverables?

1. Set up of the NPS lands as a non-MLRA soil survey area

2. SSURGO mapunit/dmu data as well as pedon and site data in NASIS

3. Emphasis on how soils fit within the park ecosystems

What does the NPS want for soil survey deliverables?

4. What's so cool about this park's soil?

5. Consistent SSURGO exports including local and standard interpretations

6. For all parks, even if mapped already, completion of NPS System Lands map unit overlaps in NASIS

1. Setting up parks as non-mlra soils survey areas

SDM, SDV, WSS are based on state-based delivery of non-mlra soil survey areas

If the park is set up as a non-mlra soil survey area the whole delivery of data to the park is made easier

1. Setting up parks as non-mlra soils survey areas

- If you need help in the process call me but first consult the NSSH Section 608.03

- Pete Biggam will supply the boundary to use
  DON'T USE ANY OTHER SOURCE!!

- Be sure the boundary from Pete has metadata with the date and source documented by NPS

(A few handouts provided for those who need it)

Boundary issues abound!

Jurisdictional, deeded, management and administrative – types of boundaries

Example: Big South Fork National Reserve and Recreation Area has a state forest in the middle- all is managed as NPS lands

Don’t digitize the park boundary beyond its established area

2. Map unit as well as pedon and site data in NASIS

Type locations, lab data, road cut observations that all may be used by NPS interpretive staff

Why point data?

Example from LAVO archeologist…..

What is needed is not a point on a map but the DATA associated with the point

Identity Tools

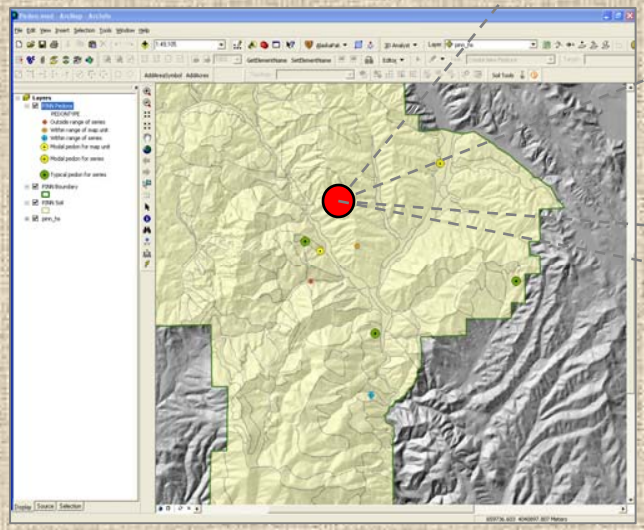
NPS is developing an ArcGIS Desktop toolset that geospatially links soils data allowing users to access soils data in an interactive manner. Focus is on the map unit descriptions, pedon point data, and ecological site descriptions. The current toolset includes a Map Unit Identify Tool and a Pedon Identify Tool.

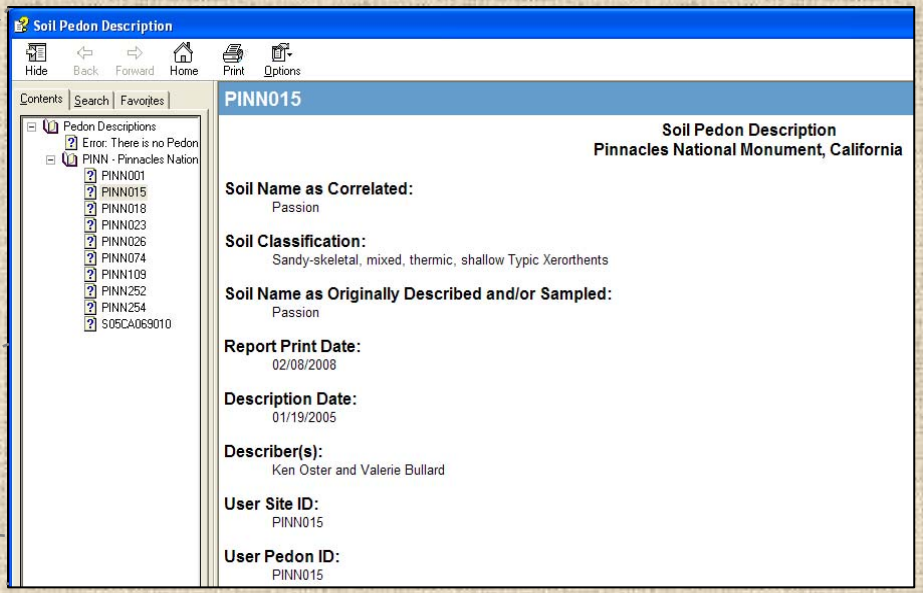
Map Unit Identify Tool

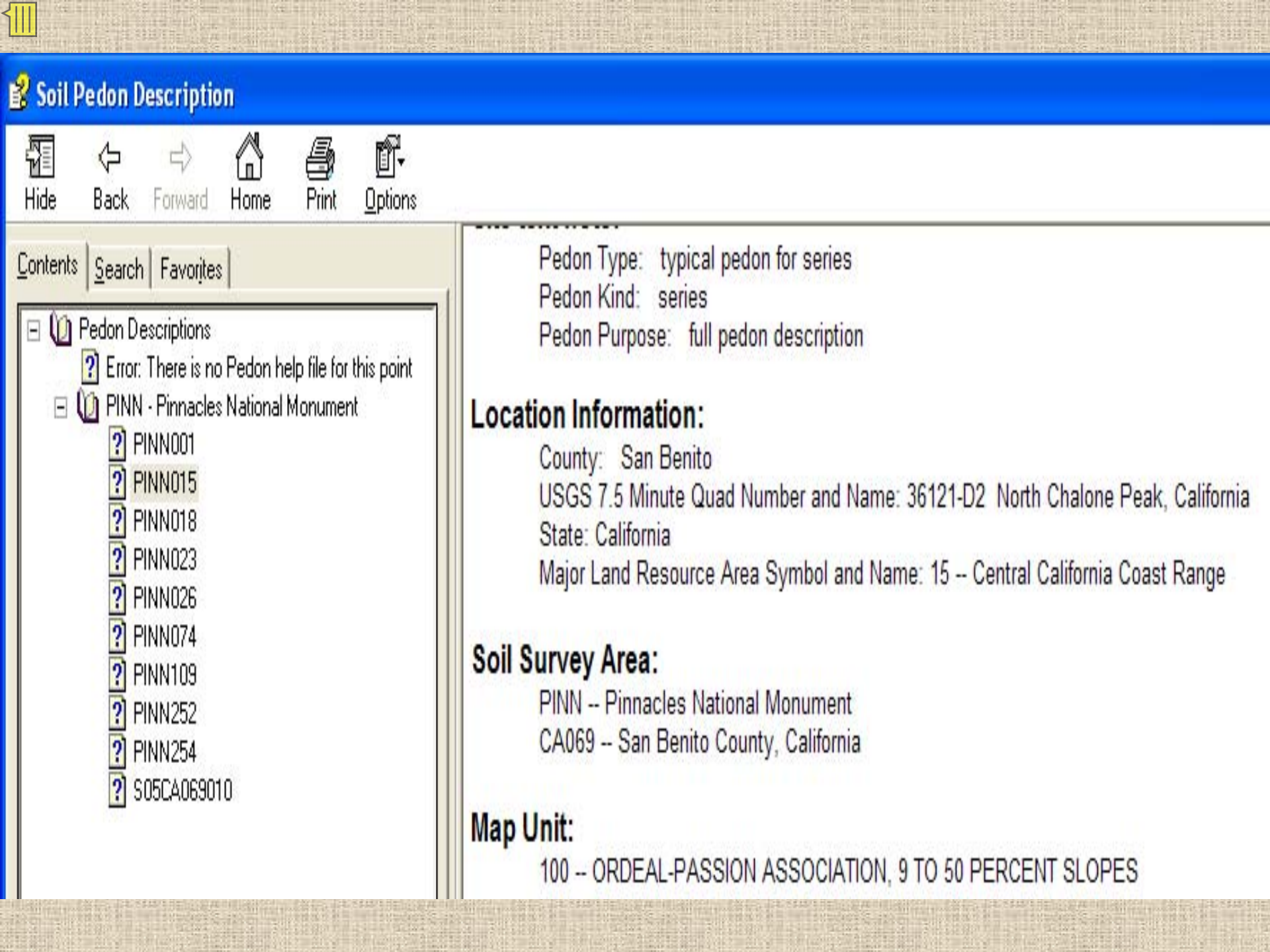
Pedon Identify Tool

Pedon Identity Tool

With Pedon Identify Tool the user selects a pedon point using the Pedon Identity Tool. All site and pedon information including a full pedon description is displayed






Soil Pedon Description
Hide
Back
Forward
Home
Print
Options
Contents
Search
Favorites
Pedon Descriptions
Error: There is no Pedon help file for this point
PINN - Pinnacles National Monument
PINN001
PINN015
PINN018
PINN023
PINN026
PINN074
PINN109
PINN252
PINN254
S05CA069010
Pedon Type: typical pedon for series
Pedon Kind: series
Pedon Purpose: full pedon description
Location Information:
County: San Benito
USGS 7.5 Minute Quad Number and Name: 36121-D2 North Chalone Peak, California
State: California
Major Land Resource Area Symbol and Name: 15 -- Central California Coast Range
Soil Survey Area:
PINN -- Pinnacles National Monument
CA069 -- San Benito County, California
Map Unit:
100 -- ORDEAL-PASSION ASSOCIATION, 9 TO 50 PERCENT SLOPES

Contents | Search | Favorites

- Pedon Descriptions
  - Error: There is no Pedon help file for this point
  - PINN - Pinnacles National Monument
    - PINN001
    - PINN015
    - PINN018
    - PINN023
    - PINN026
    - PINN074
    - PINN109
    - PINN252
    - PINN254
    - S05CA069010

Location Description:

780 meters east of the Chalone Creek Maintenance Station

Legal Description:

625 meters east and 370 meters north of the southwest corner Section 36, Township 16S, Range 7E MOUNT DIABLO Meridian
Latitude: 36 degrees 30 minutes 0.60 seconds north
Longitude: 121 degrees 9 minutes 59.30 seconds west
Datum: NAD83
Coordinates: 10 UTM Easting: 664214 meters, UTM Northing: 4040996 meters

Physigraphic Division: Pacific Mountain
Physiographic Province: Pacific Border Province
Physiographic Section: California Coast Ranges
Local Geologic Formation: Temblor
Parent Material: residuum weathered from conglomerate
Bedrock Kind: conglomerate
Bedrock Depth: 16 inches (41.0 cm)

Geomorphic Setting: crest
Upslope Shape: convex
Cross Slope Shape: linear
Slope Gradient: 10.0 percent Slope Aspect: 165 (deg)
Elevation: 1654 feet, 504.0 meters
Mean annual precipitation: inches
Mean annual air temperature (F):
Frost-free days: days

Ecological Site Number and Name:

...ry Earth Cover: Shrub cover
...lary Earth Cover: Native shrubs

...rcent 2 to 75 millimeter and 10 percent 76 to 250 millimeter

...ol Control Section:
...16 in. (25 to 41 cm):

...Features:

	Top Depth (in)	Bottom Depth (in)	Top Depth (cm)	Bottom Depth (cm)
...Epipedon	0	7	0	18
...Contact	16		41	

...trictive Features:

	Top Depth (in)	Bottom Depth (in)	Top Depth (cm)	Bottom Depth (cm)
...ck, Paralithic	16		41	

...ured Properties:

...es:

...nes, (0 to 8 cm); grayish brown (10YR 5/2) loamy sand, very dark grayish brown (10YR ...percent clay; weak fine subangular blocky structure, soft, friable, slightly sticky, ...any very fine roots throughout; many very fine irregular pores; 10 percent 2 to 5 ...ghtly acid, pH 6.5 ; clear wavy boundary.

...nes, (8 to 18 cm); brown (10YR 5/3) gravelly loamy sand, brown (10YR 4/3) moist; 5 ...weak fine subangular blocky structure, soft, very friable, slightly sticky, ...any very fine roots throughout; many very fine irregular pores; 5 percent 2 to 5 ... 10 percent 20 to 75 millimeter and 10 percent 5 to 20 millimeter; neutral, pH 7.0 ; ...undary.

...nes, (18 to 41 cm); light yellowish brown (10YR 6/4) very gravelly loamy sand, dark ...vn (10YR 4/4) moist; 5 percent clay; weak fine subangular blocky structure, slightly ...ble, nonsticky, nonplastic; many very fine roots throughout; many very fine ...; 5 percent 5 to 20 millimeter and 15 percent 76 to 250 millimeter and 20 percent 2 ...; neutral, pH 7.0 ; clear wavy boundary.

...ches, (41 to 155 cm); very gravelly loamy sand; HORIZON NOTE: Soft, massive

Prima...
Secon...

Surface Fr...
20 pe...

Particle Siz...
9.8 to...

Diagnostic...

Kind...

Ochric...
Paralithic...

Pedon Res...

Kind

Bedro...

Field Meas...

Pedon Not...

A1--0 to 3 inch... 3/2) moist; 5 p... nonplastic; ma... millimeter; slig...

A2--3 to 7 inch... percent clay; v... nonplastic; ma... millimeter and... clear wavy bou...

C--7 to 16 inch... yellowish brow... hard, very friab... irregular pores... to 5 millimeter...

Cr--16 to 61 in... conglomerate.

What do you have to do?

- Don’t worry…just get pedon/site data in NASIS
- Send me the final pedon list using NASIS report **“NPS DATA DUMP – Pedon and Site List Info for Deliverables”**
- I’ll do the export of data in the format the park needs – I just need a list of your pedons in the park

What do you have to do?

When providing photos name them by their <u>user site id in NASIS</u>

P pedon; v for veg; l for landscape – possible scenario for labeling

Soil names often change – don’t use in file name

Local naming conventions often don’t mean anything to anyone else but User Site ID does since it is a unique in the database

Photo map units

An aside…..

- For 100 years we've been making soil descriptions and many are lost
- NASIS allows us to preserve and protect these observations
- Recently a fire in a field office destroyed all soils observations. They were lost because they were not in NASIS

Park 4

3. Emphasis on how soils fit within the parks ecosystems

Park 5

- Completed ESDs - where funded
- Photos of map unit with representative vegetation
- Block diagrams
- GSM with soil formation theme

ESD links on desktop

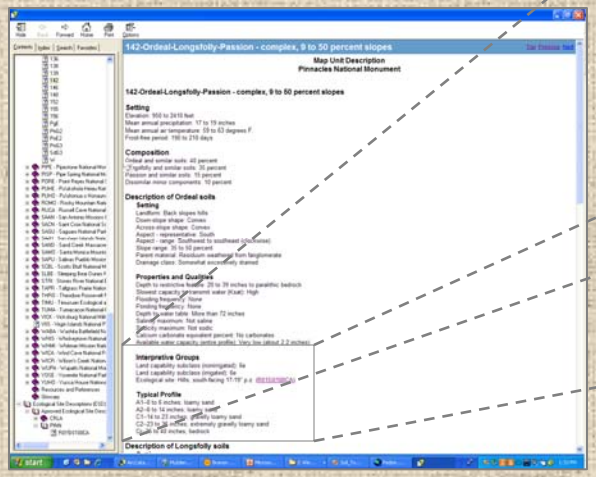
From the pedon description or map unit description, the ESD can be accessed via a hyperlink if…

1. there is a NRCS approved ESD Report for that map unit and

2. ESD info is populated in NASIS (every major and hydric minors components)

and in pedon tables)

ESD hyperlink



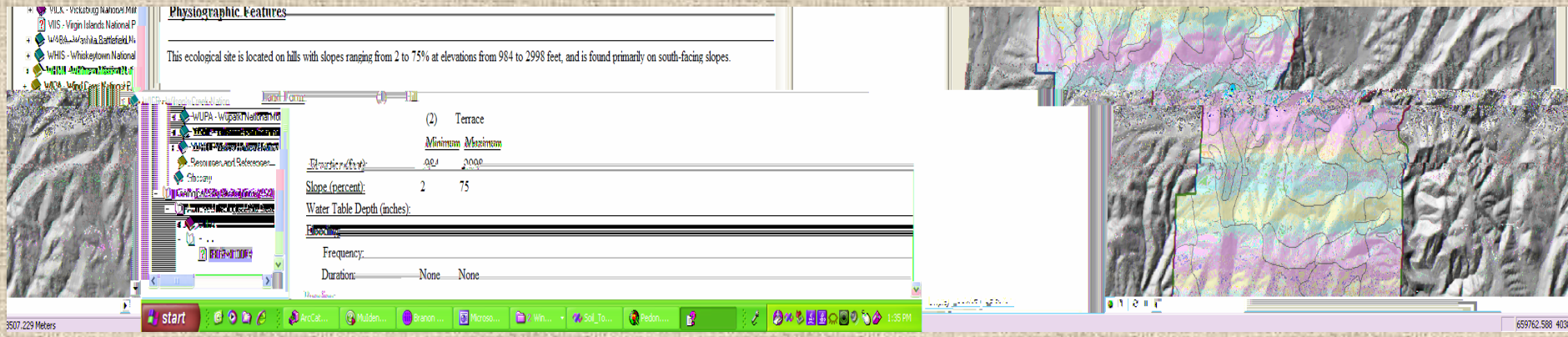
Interpretive Groups

Land capability subclass (nonirrigated): 6e
Land capability subclass (irrigated): 6e
Ecological site: Hills, south-facing 17-19" p.z. (R015XI100CA)

Typical Profile

A1--0 to 6 inches; loamy sand
A2--6 to 14 inches; loamy sand
C1--14 to 23 inches; gravelly loamy sand
C2--23 to 36 inches; extremely gravelly loamy sand
Cr--36 to 40 inches; bedrock

ESD Hyperlink

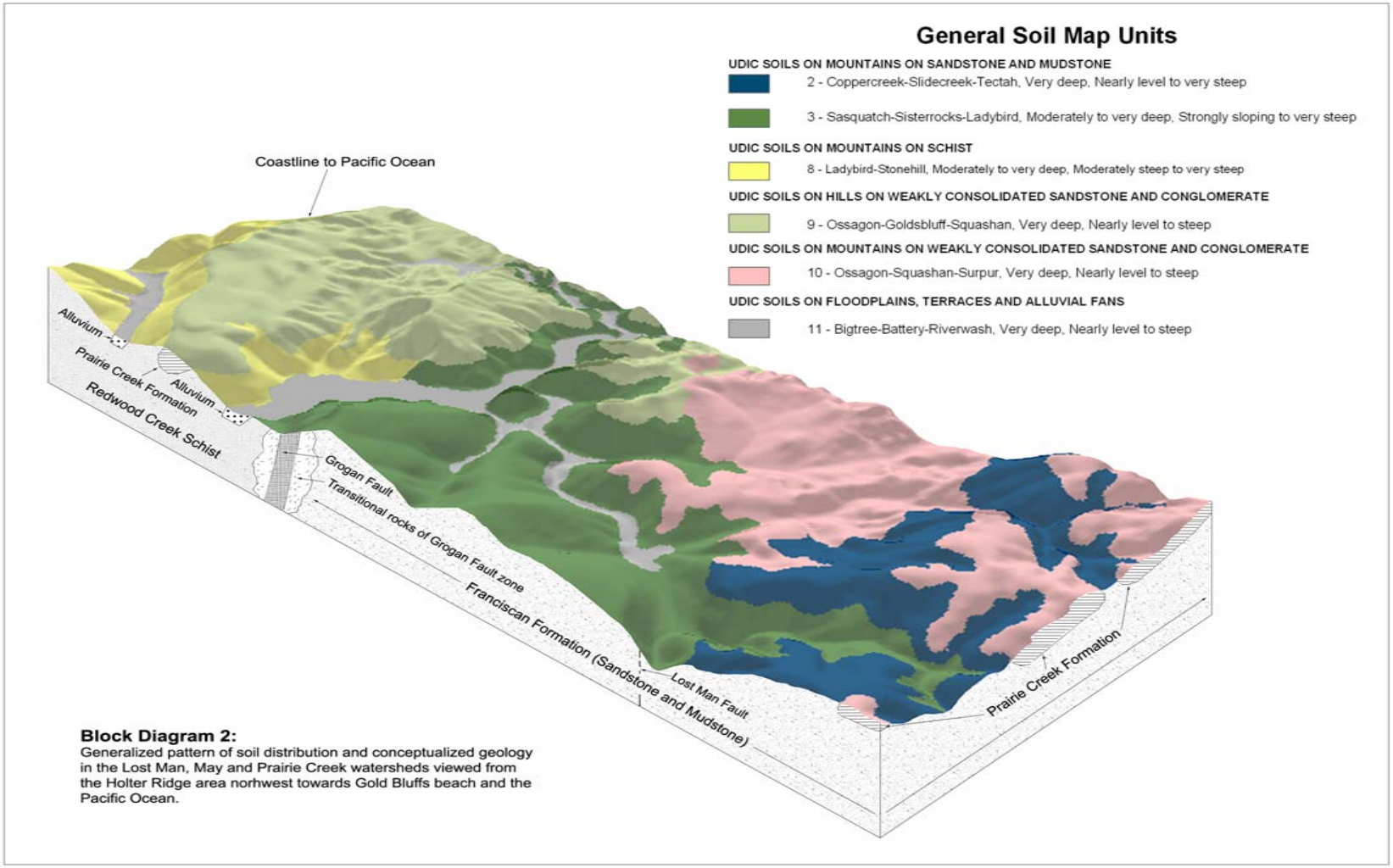


Example block diagrams using SSURGO

Stylized geologic formations added in

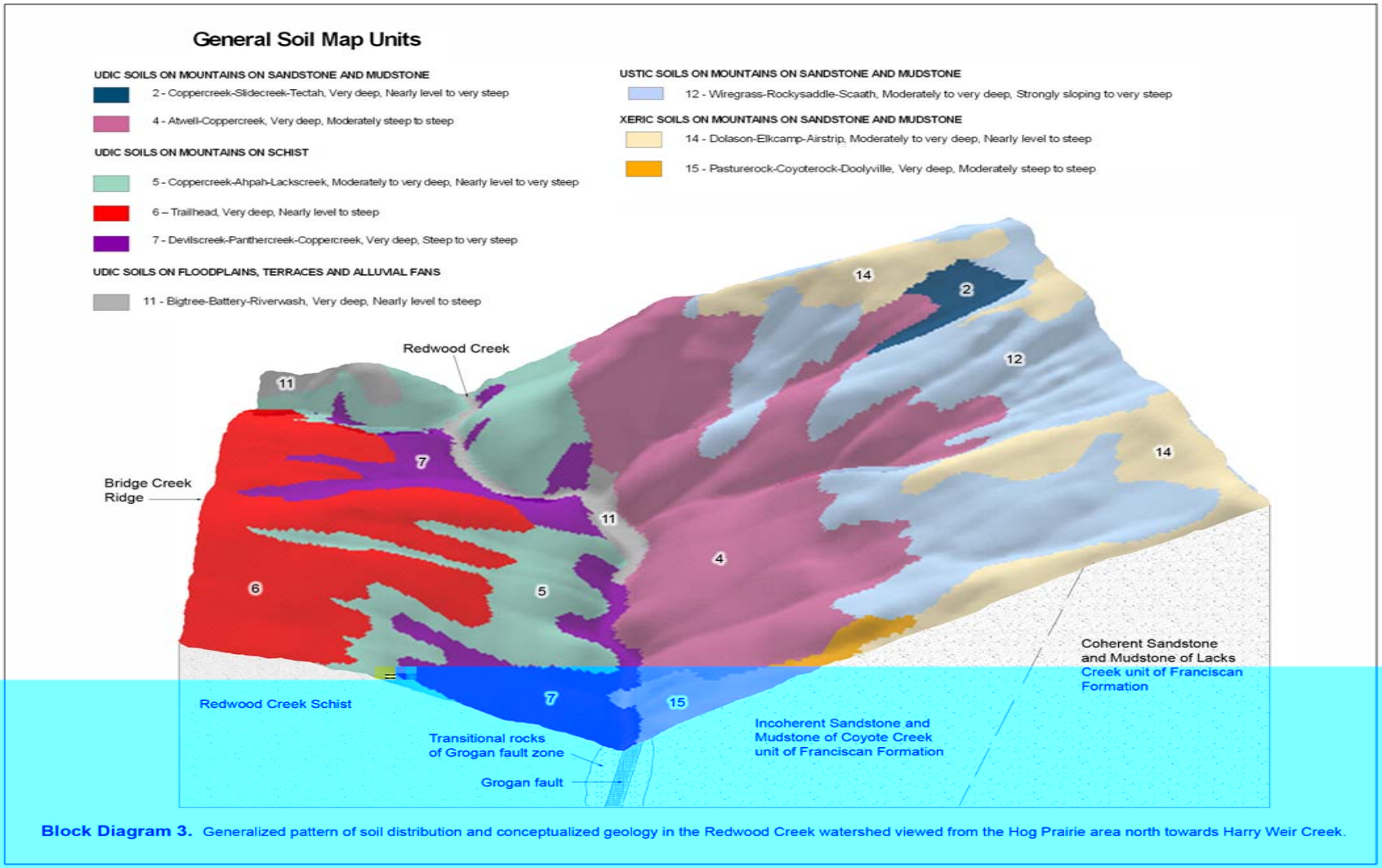
Map units aggregated together

Redwoods NP (REDW)



Block Diagram 2:
Generalized pattern of soil distribution and conceptualized geology in the Lost Man, May and Prairie Creek watersheds viewed from the Holter Ridge area norhwest towards Gold Bluffs beach and the Pacific Ocean.

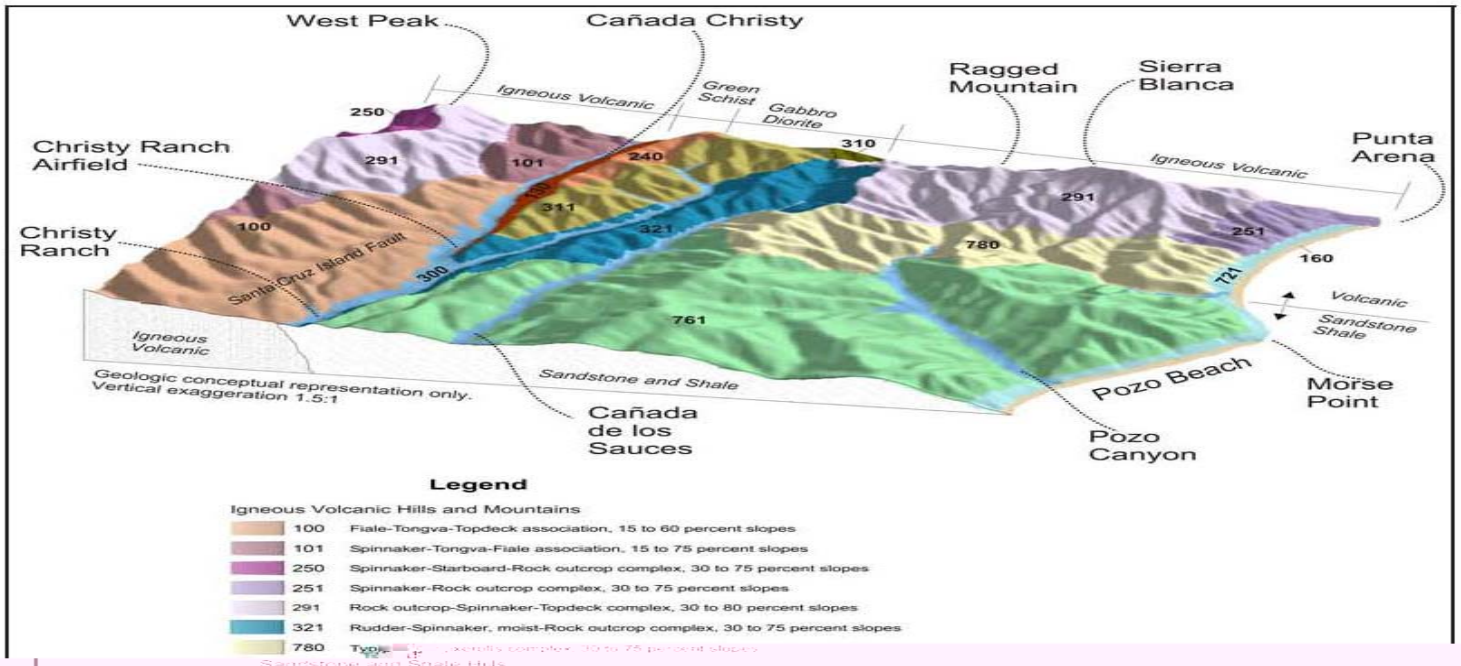
Redwoods NP (REDW)



Block Diagram 3. Generalized pattern of soil distribution and conceptualized geology in the Redwood Creek watershed viewed from the Hog Prairie area north towards Harry Weir Creek.

Channel Islands NP (CHIS)

Soil Survey of Channel Islands National Park, California



Legend

Igneous Volcanic Hills and Mountains

100	Fiale-Tongva-Topdeck association, 15 to 60 percent slopes
101	Spinnaker-Tongva-Fiale association, 15 to 75 percent slopes
250	Spinnaker-Starboard-Rock outcrop complex, 30 to 75 percent slopes
251	Spinnaker-Rock outcrop complex, 30 to 75 percent slopes
291	Rock outcrop-Spinnaker-Topdeck complex, 30 to 80 percent slopes
321	Rudder-Spinnaker, moist-Rock outcrop complex, 30 to 75 percent slopes
780	Typic [illegible] complex, 30 to 75 percent slopes

Sandstone and Shale Hills

721	Bluffthe sandy loam, 9 to 30 percent slopes
761	Lodestone-Typic Xerorthents-Wreluge complex, 25 to 65 percent slopes

Green Schist Hills

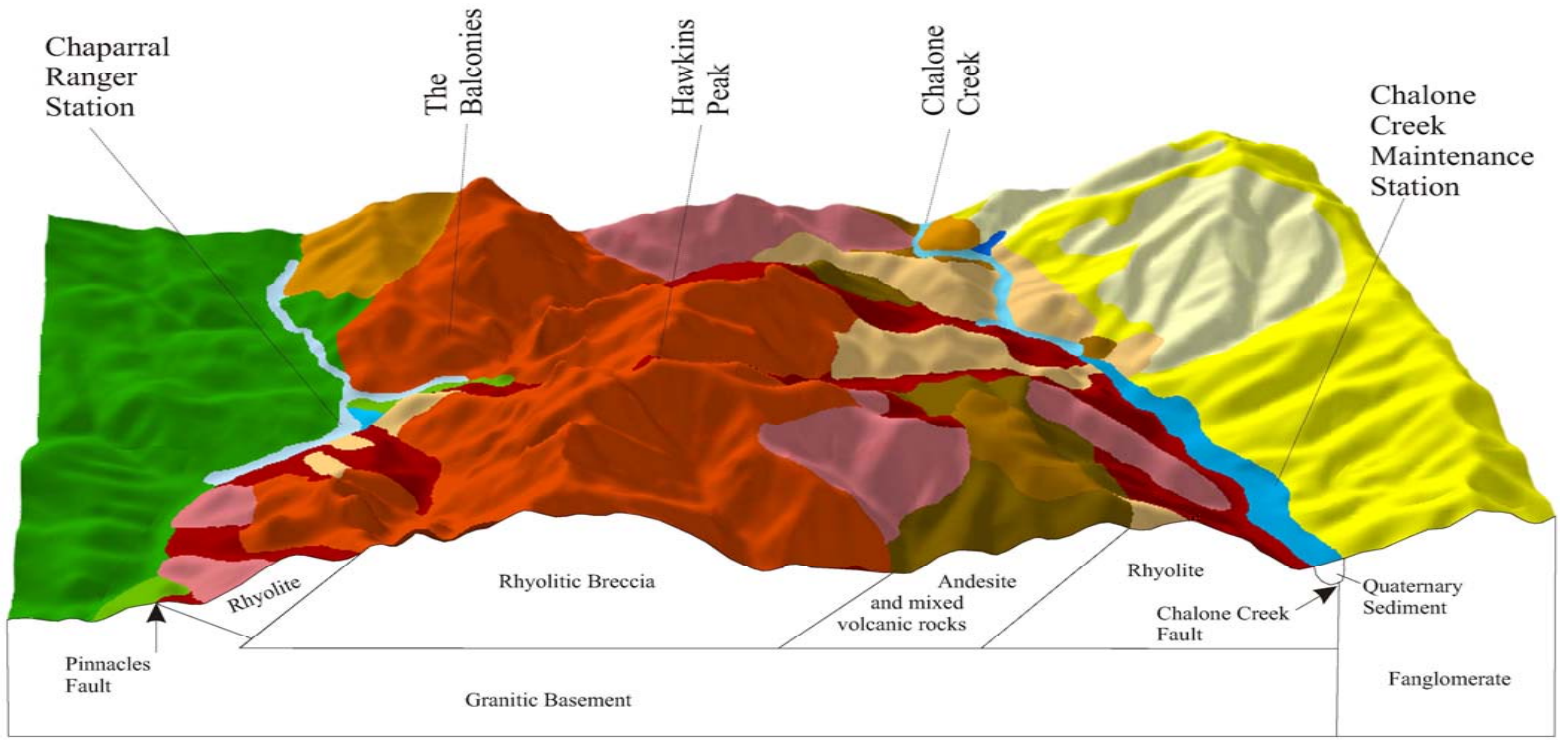
130	Tepple-Yardam association, 30 to 75 percent slopes
240	Delphine-Manotus-Yardam [illegible]

Block Diagram Location

Santa Cruz Island

Figure 29.—Looking northeast on Santa Cruz Island. The Santa Cruz Island fault runs east along Canada Christy. The various kinds of parent material are depicted.

Pinnacles Nat'l Monument (PINN)



Conceptual representation of geology. Vertical exaggeration 1.5:1.

4. What so cool about my park's soil?

Integrating soil science into park educational material

Emphasis on soils as the dynamic interface between rock and plant

4. What's so cool …continued

Series Type Locations – accurately populated in NASIS pedon

Special properties – tephra layers, horizons from historic floods, rare plants

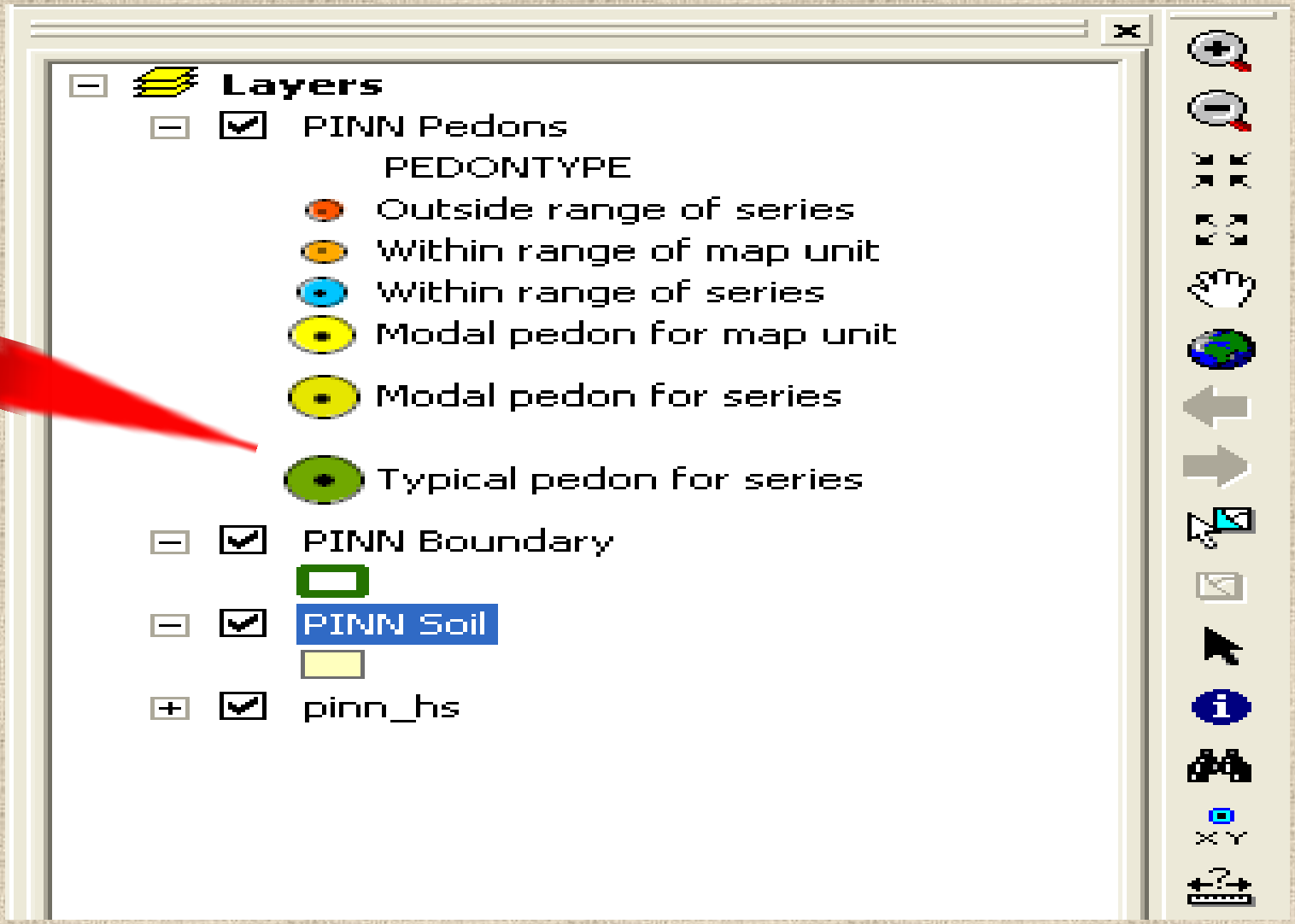
Unique to park – mapped nowhere else …a park story to tell

Benchmarks – what an opportunity to preserve a site!

Monoliths – for visitor center display

Series Type Locations

identified in NASIS pedon and in export to park

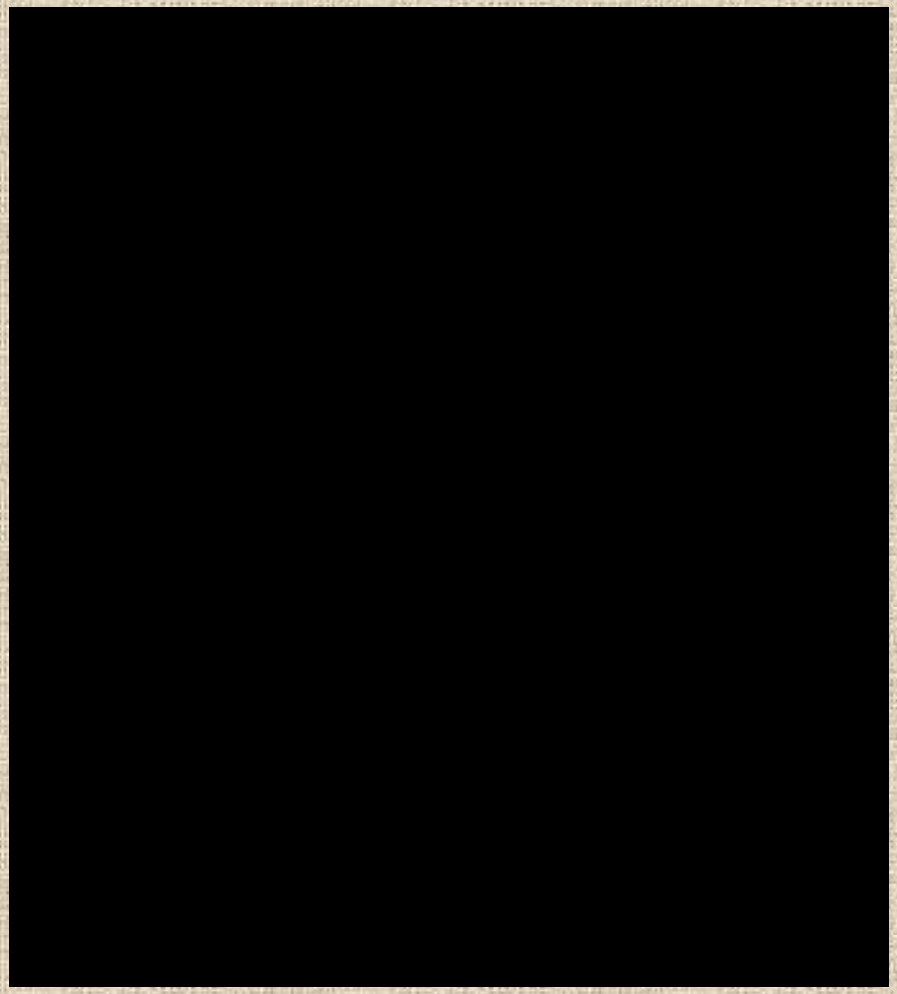


4. What so cool….continued

Soil fact sheets – provide me a sketch of ideas or write your own fact sheet that could be used locally

Monoliths

5. Consistent SSURGO exports including local and standard interpretations



Include all interpretations in the agreement

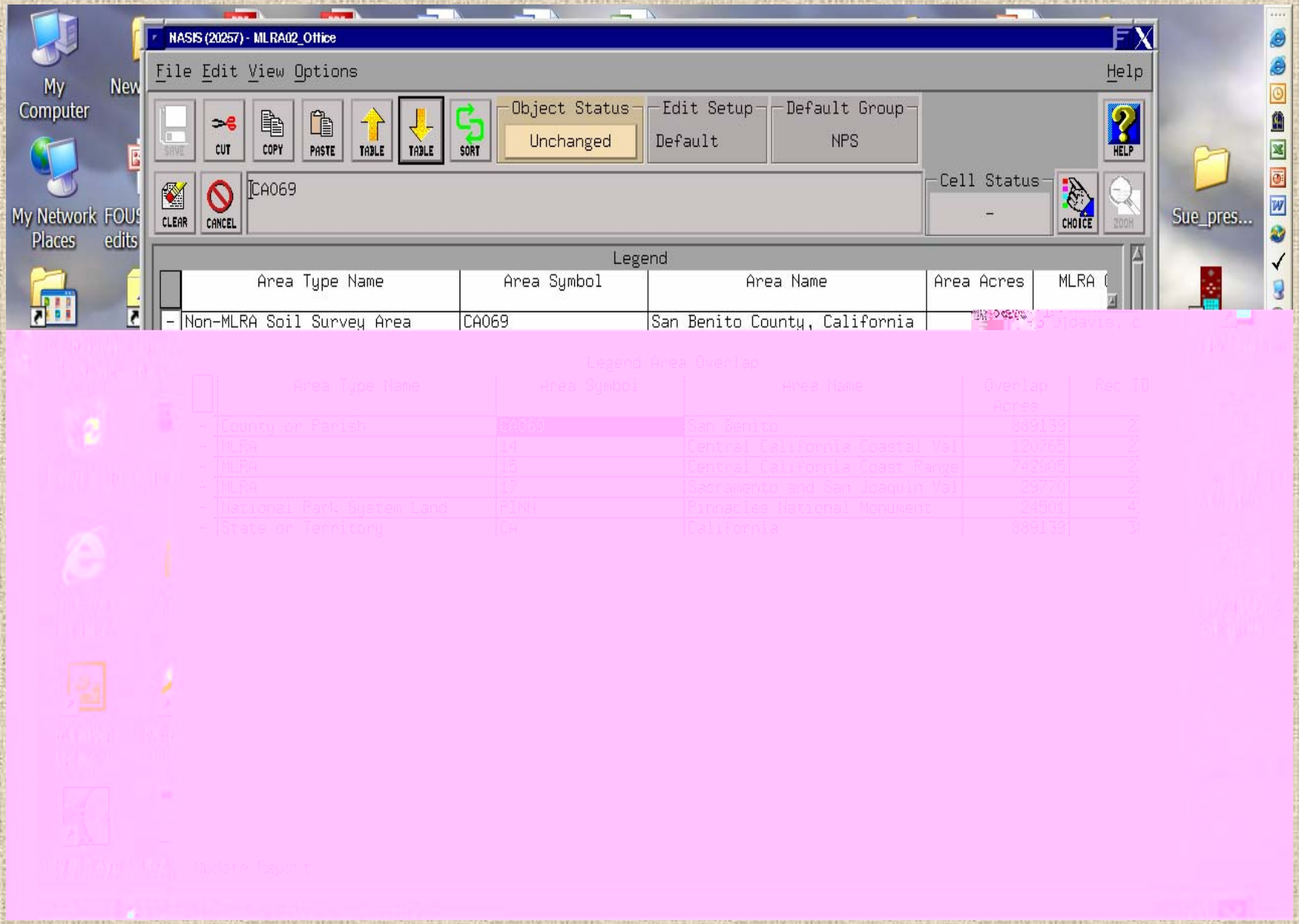
Check with me before doing a park SSURGO export incase anything new we want to include

NPS template in the works

6. Population of the National Park System Lands Legend Area Overlaps in NASIS

WHY?

- Overlap table is included in SDM export as an overlap table. This allows automatic update of symbols and data
- Many parks lands are multi-county within a state. Overlaps allow selection of park map units by standard four letter park code
- SDM report manager allows selection by overlaps – can run special park reports uniformly across many SSAs


NASIS (20257) - MLRA02_Office
File Edit View Options
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CA069
Cell Status
-
CHOICE
ZOOM
Legend
Area Type Name
Area Symbol
Area Name
Area Acres
MLRA
Non-MLRA Soil Survey Area
CA069
San Benito County, California
My Computer
My Network Places
Sue_pres...

For “harvested” data of parks already mapped

I have prepared overlap legends for 154 non-mlra soil survey areas from the following states:

AL AR AZ DC FL GA IA IN KY LA MD ME MI MO MS MT NC ND NE NJ NM NV NY OH OR PA SC SD TN TX VA WA and WV

The 154 legends represent 43 parks

For “harvested” data of parks already mapped

I can either:

1. Provide the NPS overlap list to each states database manager for them to enter in NASIS

or

2. The state NASIS database manger can give me permissions to the legend object and I will enter NPS overlaps

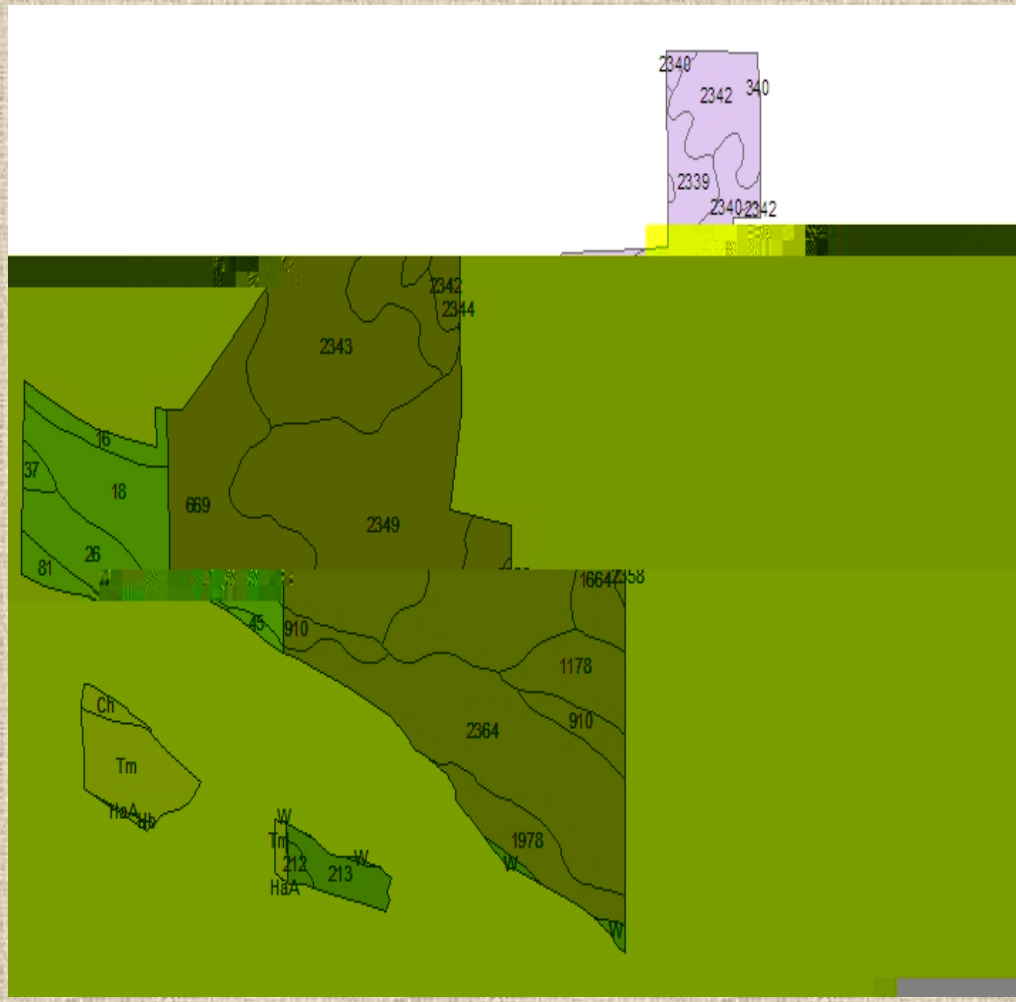
See handout

ACADIA NP, Maine

This park is a good example for use of overlaps….many islands of ownership, and the multi-county park has only one shared symbol – Water which we resolved in the attribute table in ARCMAP

Two states and 4 Soil survey areas

Many parks lands are multi-state, multi-county so creating a understandable NPS legend requires quite a bit of post-processing after SDM harvesting



Disadvantages of Overlaps

1. **Does not create one park legend**

2. **Multi-county parks still have issues with**

   a) **Numerous symbols with different data**
   b) **Same symbols with different data**
   c) **Same symbols with different mu names**
   d) **Different symbols with same map unit name**

Disadvantages of Overlaps

3. Maintenance required by MO/States as soil mapping updates occur (i.e. adding new map units, etc)

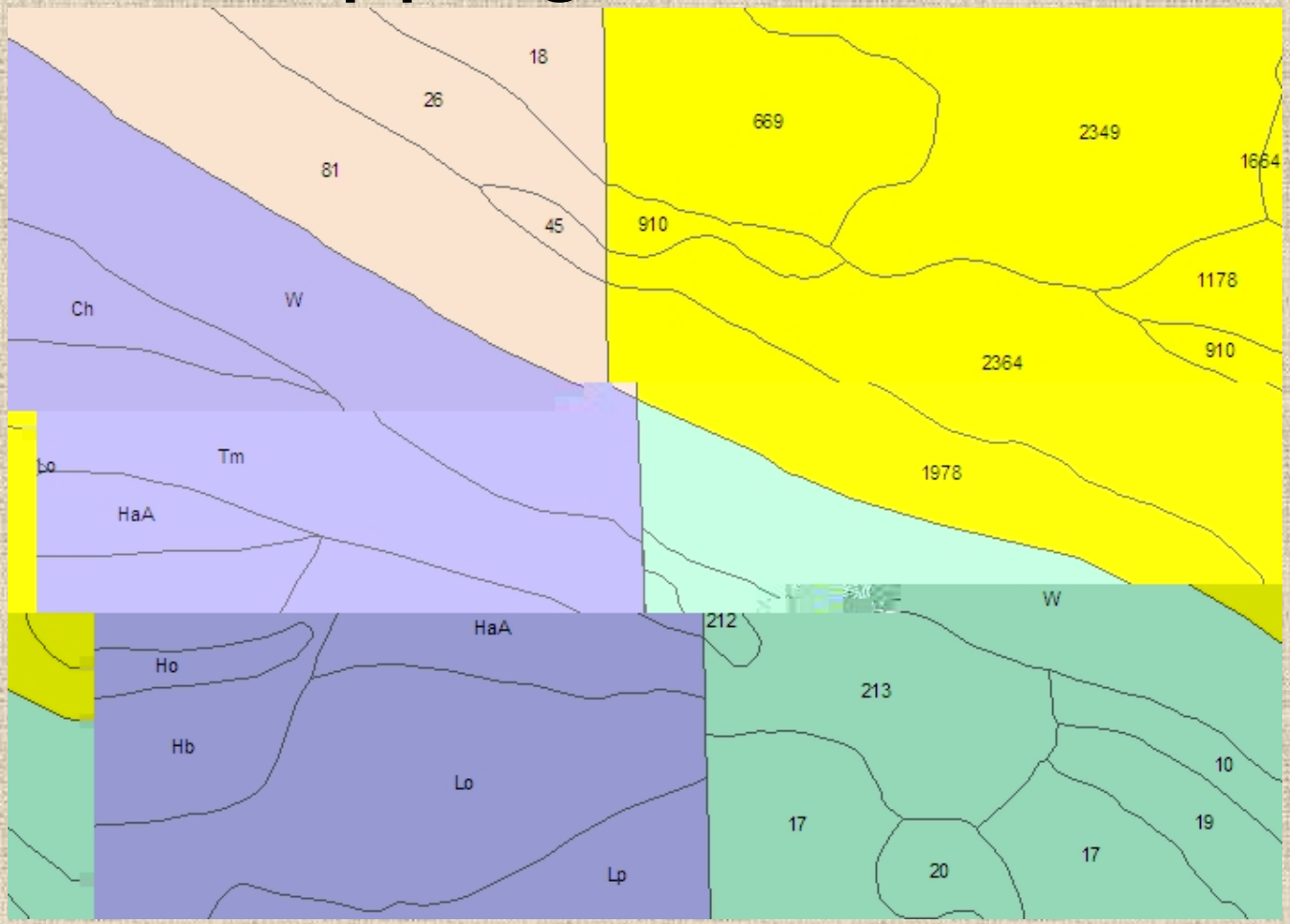
4. Overlaps legends not available on WSS, SDV

5. Future boundary changes

Simply….

Not always best answer for parks that can be set up as non-mlra soil survey areas

We know this is what update mapping is all about



My analysis will help target parks with specific needs that may be funded as part of Natural Resource challenge

Trying to use overlaps to create a park legend

MU Symbol	MU name	DMU ID
53B	Savage-Daglum silt loams, 0 to 6 percent slopes	208966
53B	Chama-Sen-Cabba silt loams, 3 to 6 percent slopes	208941

Same sym, different mu name, different data

19C	Chama-Cabba-Sen silt loams, 6 to 9 percent slopes	208942
53C	Chama-Cabba-Sen silt loams, 6 to 9 percent slopes	208942

Different sym, same mu name, same data

102B	Boxwell-Kremlin loams, 0 to 6 percent slopes	209008
102B	Kremlin-Ethridge-Gerda complex, 0 to 6 percent slopes	210020
92B	Kremlin-Ethridge-Gerda complex, 0 to 6 percent slopes	210020

Third scenario - both conditions above

Any questions?

Now some fun stuff…..

California Soil Resource Lab

Map Unit Composition

Map units consist of 1 or more soil types, commonly referred to as "components".

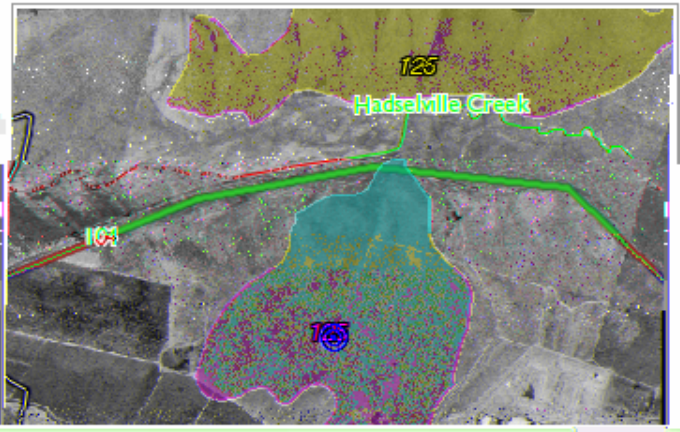
Component Name	% of Map Unit	Component Type	Horizon Data
Soil Type 1 **Corning**	45	Major Soil Type	YES
Soil Type 2 **Corning**	40	Major Soil Type	YES
Soil Type 3 **Creviscreek**	4	Inclusion	Similar Data [1] *
Soil Type 4 **Hicksville**	4	Inclusion	Similar Data [3] *
Soil Type 5 **Redding**	4	Inclusion	Similar Data [2] *
Soil Type 6 **Steeper slopes, unnamed**	3	Inclusion	None

*Note: links to horizon data marked with an * are approximate.*

Map Unit Data *What is a Map Unit?*

Cartographic information about this map unit.

Map Unit Name:	Corning complex, 0 to 8 percent slopes
Map Unit Type:	Complex
Map Unit Symbol:	125
Map Unit Acres:	174 acres (14990ac. total in survey area)



Map Unit Aggregated Data

Generalized soil information for this map unit.

Farmland Class:	Not prime farmland
Available Water Storage (0-100cm):	8.95 cm
Max Flood Freq:	None
Drainage Class:	Well drained
Hydric Conditions:	Partially hydric
Min Water Table Depth:	n/a

CA Soil Resource Lab (UC Davis)

Zoom to Street Address:

Address:
City
State:
GO

Zoom to CA PLSS Grid:

Section Information

1/4 1/4 **Section**

Township / Range Information

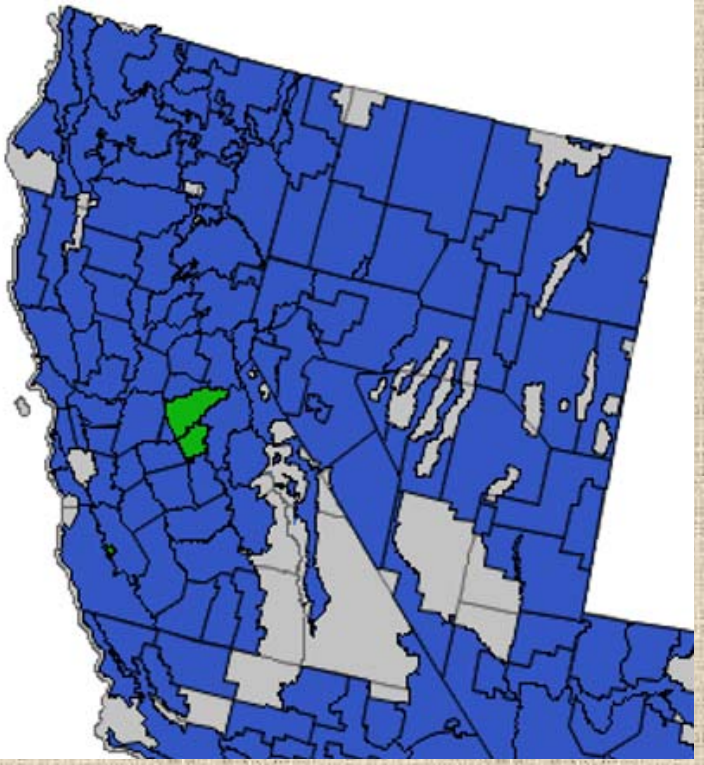
T N **R** E Mt. Diablo, CA

GO

Zoom to Geographic Coordinates:

	Decimal Degrees	*Degrees Minutes Seconds*
Latitude:	° North	° ′ " North
Longitude:	° West	° ′ " West

GO



Soil-Web: CA, AZ, NV - Microsoft Internet Explorer

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Back Search Favorites

Address http://casoilresource.lawr.ucdavis.edu/soil_web/ssurgo.php?action=explain_component&mukey=461869&cok Go Links

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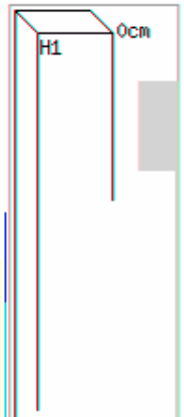


Soil Taxonomy

Order:	*Alfisols*
Suborder:	*Xeralfs* [Map of Suborders]
Greatgroup:	*Palexeralfs*
Subgroup:	*Typic Palexeralfs*
Family:	*Fine, mixed, thermic Typic Palexeralfs*
Phase:	*Gravelly complex 0 to 8 percent slopes*

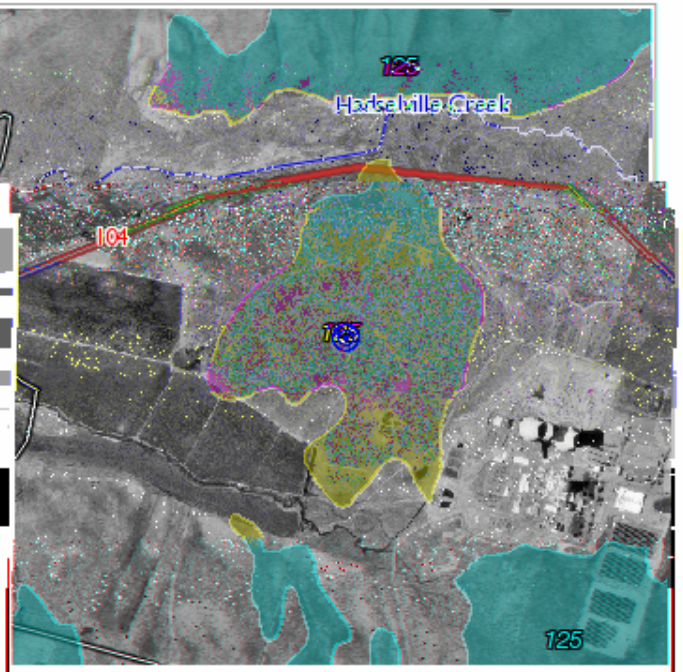
Data:	[Lab Data] [Nitrate Groundwater Pollution Hazard Index]
Raw Data	Component All Horizons

Land Classification

Storie Index	36
Land Capability Class [non-irrigated]	3-e
Land Capability Class [irrigated]	2-e

Soil Suitability Ratings

Waste Related	*Engineering*
Urban/Recreational	*Irrigation*
Wildlife	*Runoff*



Queried map unit polygons in yellow, queried point in red.

Erosion

Wind Erodibility Group	*6*
Wind Erodibility Index	*48*
T Erosion Factor	*4*
Runoff	*High*
Drainage	*Well drained*
Parent Material:	*gravelly alluvium*

Geomorphology

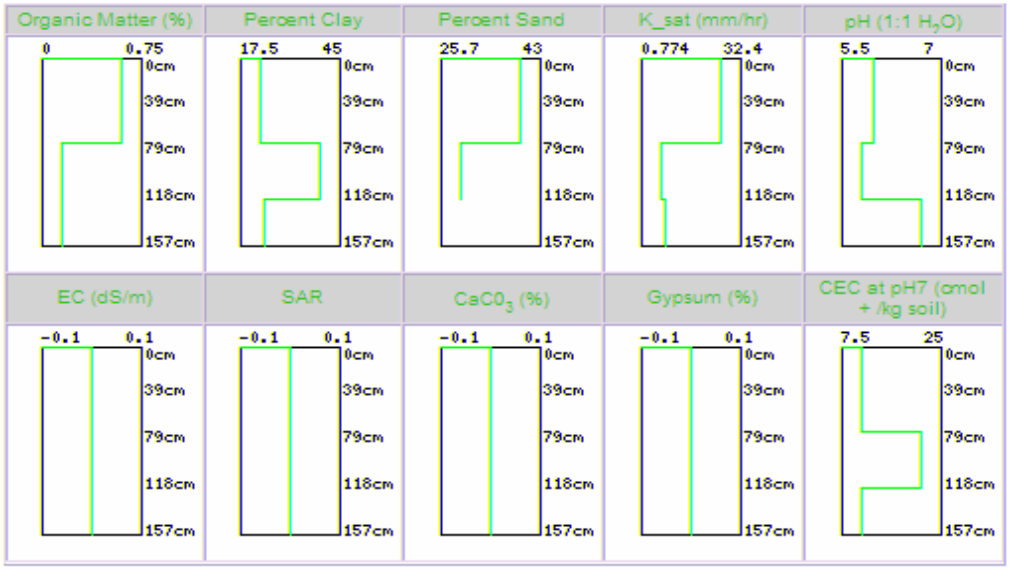
Typical profile..

Landscape	*valleys*	
Landform	*terraces*	[Toeslope]

Done Internet

Organic Matter (%)	Percent Clay	Percent Sand	K_sat (mm/hr)	pH (1:1 H_2O)
0 0.75	17.5 45	25.7 43	0.774 32.4	5.5 7

EC (dS/m)	SAR	$CaCO_3$ (%)	Gypsum (%)	CEC at pH7 (cmol + /kg soil)
-0.1 0.1	-0.1 0.1	-0.1 0.1	-0.1 0.1	7.5 25



Waste Related		
AWM - Manure and Food Processing Waste	**Very limited**	
	1. Slow water movement	*(Percolation < 2 um/sec to 60 Inches)*
	2. Runoff	*(Intake Rate)*
	3. Too acid	*(Surface Reaction (pH 3.5 to 6.5))*
	4. Droughty	*(Droughty, AWC 0 to 150cm)*
AWM - Land Application of Municipal Sewage Sludge	**Very limited**	
	1. Slow water movement	*(Percolation (1 - 4 um/sec) 0 to 60 Inches)*
	2. Too acid	*(Surface Reaction (pH 5 to 6.5))*
	3. Droughty	*(Droughty, AWC 0 to 150cm)*
AWM - Rapid Infiltration Disposal of Wastewater	**Very limited**	
	1. Slow water movement	*(Percolation (10 - 40 um/sec) 0 to 60 Inches)*
	2. Slope	*(Sloping 3.9 to > 8%)*
AWM - Slow Rate Process Treatment of Wastewater	**Very limited**	
	1. Slow water movement	*(Percolation (.4 - 4 um/sec) 0 to 60 Inches)*
	2. Too acid	*(Surface Reaction (pH 5 to 6.5))*
	3. Too steep for surface application	*(Slope 2.9 to > 8% surface)*

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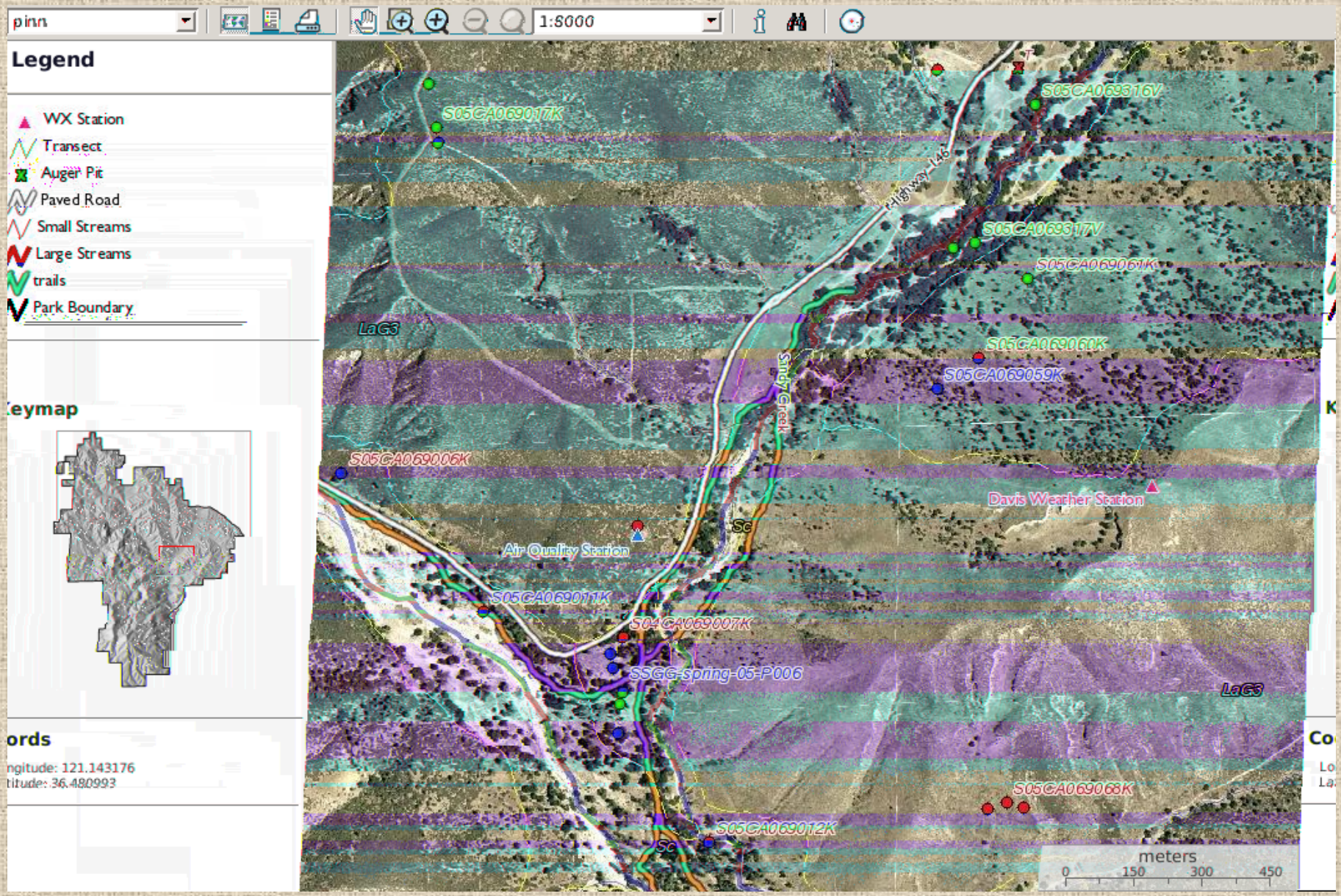
Engineering

ENG - Septic Tanks (CA)	**Limitations** 1. Permeability < .6/hr in 24-60 (slow perc)	*(Perm (slow perc) in 60-150cm, l, h, rv)*
ENG - Sewage Lagoons (CA)	**Limitations** 1. Slopes 2 to 8% 2. Permeability .6-2/hr (some seepage)	*(Slopes, 2-8% - MO2)* *(Perm (seepage) .6 to >2/hr, 30-150cm (12-60) - MO2)*
ENG - Sanitary Landfill (Trench) (CA)	**Limitations** 1. Clay loam, silty clay, silty clay loam	*(Clayey texture, 25 to 180cm w/min and climate condition-MO2)*
ENG - Dwellings W/O Basements (CA)	**No limitations**	
ENG - Dwellings With Basements (CA)	**Limitations** 1. Shrink-swell (LEP >6)	*(Shrink-Swell, (LEP thick. layer above R or 150cm) - MO2)*
ENG - Small Commercial Buildings (CA)	**Limitations** 1. Slopes are from 4 to 8%	*(Slopes, rv < 4 to > 8% - MO2)*
ENG - Shallow Excavations (CA)	**Limitations** 1. Caving potential 2. Clay from 40 to 60%	*(Caving, cutbanks - MO2)* *(Clay %, >40, 50-150cm - MO2)*
ENG - Sanitary Landfill (Area) (CA)	**No limitations**	
ENG - Daily Cover for Landfill (CA)	**Not suited** 1. Depth to pan > 60	*(Depth to cemented pan 100-150cm - MO2)*
	3. Not ponded	*(Ponding, any (use to be copied 1000, >Apr) - MO2)*
	5. Texture is not sandy	*(USDA texture, sandy textures, thickest, 25-150cm - M*
ENG - Local Roads and Streets (CA)	**No limitations**	
ENG - Construction Materials; Topsoil (CA)	**Poor source** 1. Rock fragment content 3. Hard to reclaim	*(POT - Gravel and rocks in the thickest layer to 100c* *(POT - Gravel and rocks in the thickest layer 100-180*
ENG - Construction Materials; Roadfill (CA)	**Poor source** 1. AASHTO GIN > 8 (low soil strength) 2. LEP 3 to 9	*(POT - Strength (AASHTO GIN) thickest in 25-500cm* *(POT - LEP wt. av. (25-150cm or restrictive layer) - M*
ENG - Construction Materials; Reclamation (CA)	**Fair source** 1. OM is .5 to 1% 2. pH is between 4 and 6.5 above 40 3. AWC 3 - 6 to 60 depth	*(POT - OM % <.5 to 180cm - MO2)* *(POT - pH Minimum (acid) test)* *(POT - AWC 3-6 in 0-150cm - MO2)*
ENG - Construction Materials; Sand Source (CA)	**Poor source** 1. Bottom layer not a source 4. Thickest layer not a source	*(POT - Sand: bottom layer - MO2)* *(POT - Sand: thickest layer (based on sieves) - MO2)*
ENG - Construction Materials; Gravel Source (CA)	**Poor source**	

Done Internet


pinn
1:8000
Legend
WX Station
Transect
Auger Pit
Paved Road
Small Streams
Large Streams
trails
Park Boundary
Keymap
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titude: 36.480993
S05CA069017K
S05CA069316V
Highway 146
S05CA069317V
S05CA069061K
LaG3
S05CA069060K
S05CA069059K
Sandy Creek
S05CA069006K
Davis Weather Station
Air Quality Station
S05CA069011K
S04CA069007K
SSGG-spring-05-P006
LaG3
S05CA069068K
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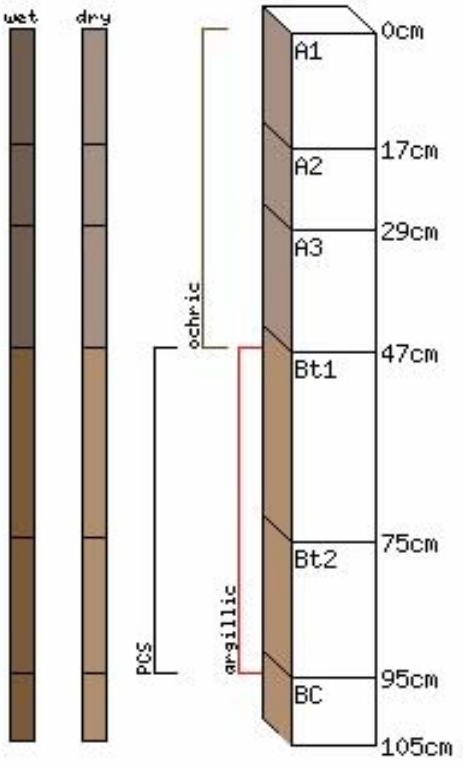
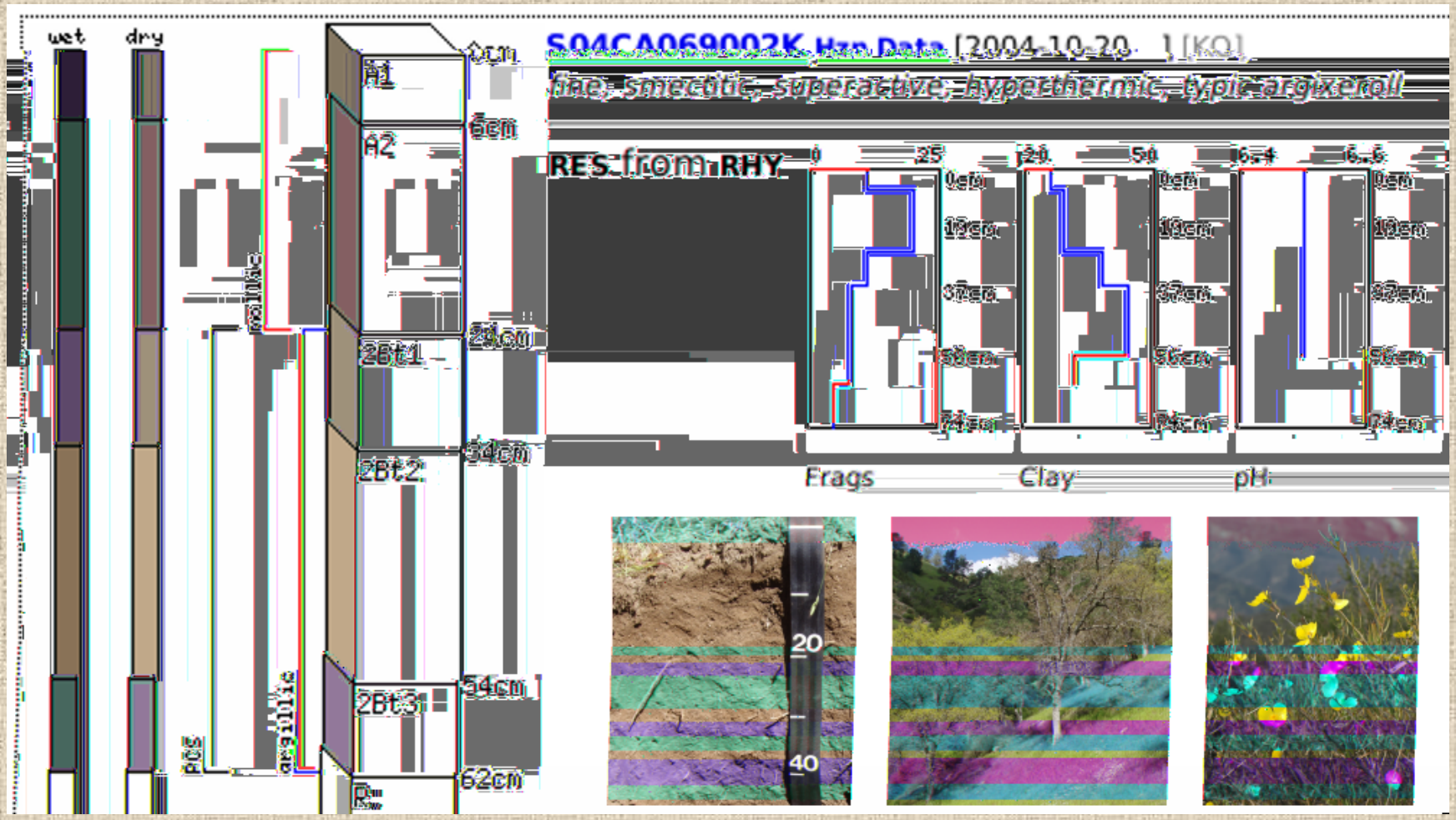
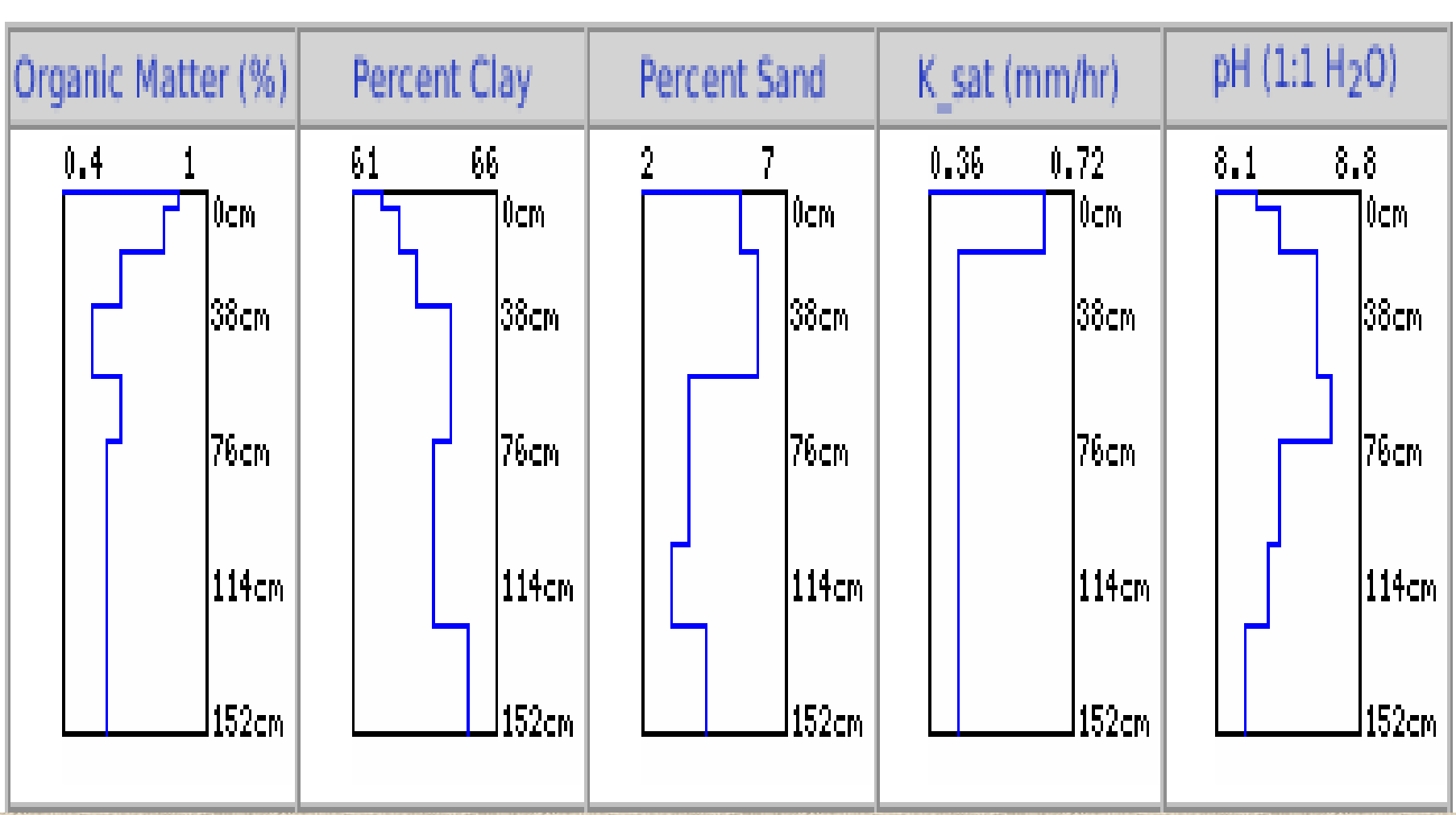
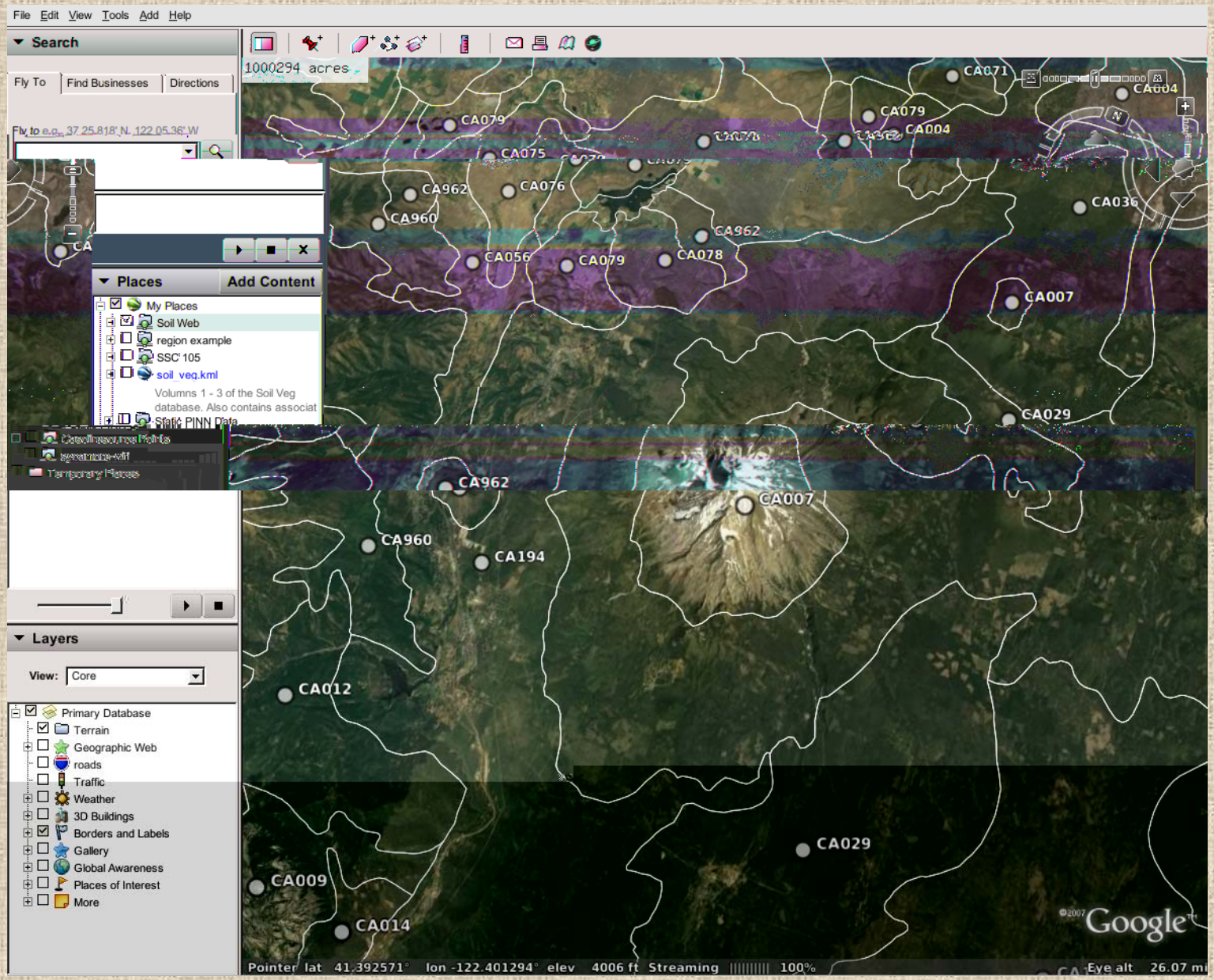


- Describers : ACF
- Classification : fine, mixed, superactive, thermic, typic haploxeralf

Directions: To here - From here

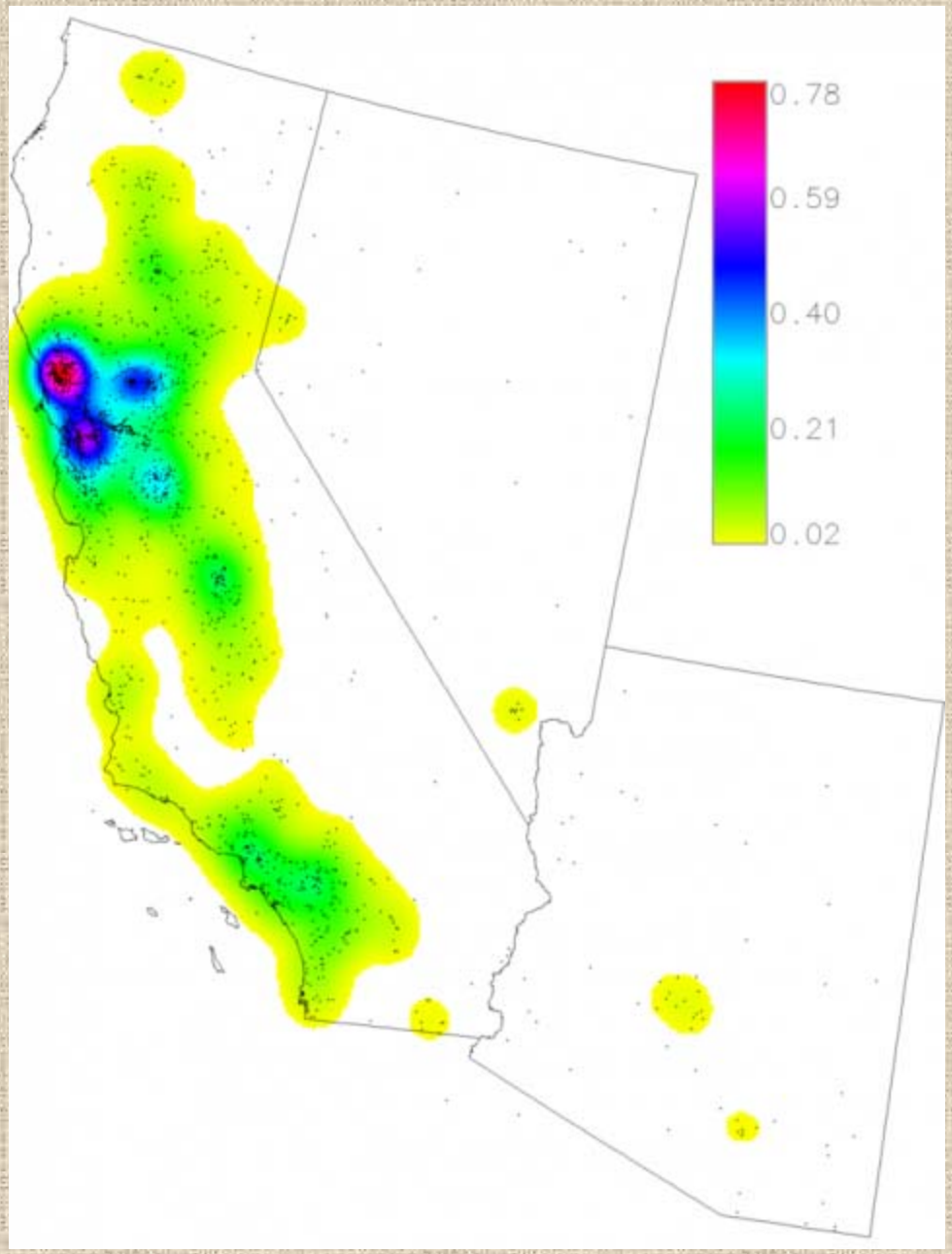

wet
dry
S04CA069002K Hzn Data [2004-10-20] [KQ]
fine, smectitic, superactive, hyperthermic, typic argixeroll
RES from RHY
0cm
6cm
24cm
34cm
54cm
62cm
A1
A2
2Bt1
2Bt2
2Bt3
2Cu
argillic
argillic
RES
0
25
20
50
6.4
6.6
Frags
Clay
pH
20
40


Organic Matter (%)
0.4
1
0cm
38cm
76cm
114cm
152cm
Percent Clay
61
66
0cm
38cm
76cm
114cm
152cm
Percent Sand
2
7
0cm
38cm
76cm
114cm
152cm
K_sat (mm/hr)
0.36
0.72
0cm
38cm
76cm
114cm
152cm
pH (1:1 H2O)
8.1
8.8
0cm
38cm
76cm
114cm
152cm

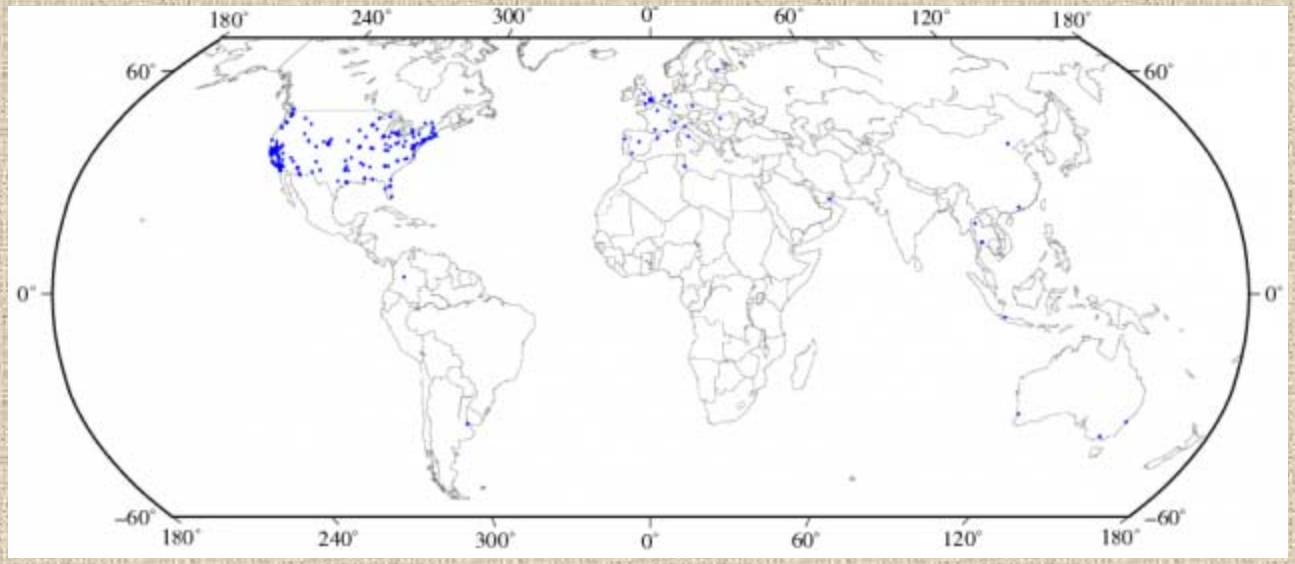

File Edit View Tools Add Help
Search
Fly To
Find Businesses
Directions
Fly to e.g., 37 25.818' N, 122 05.36' W
Places
Add Content
My Places
Soil Web
region example
SSC 105
soil_veg.kml
Volumns 1 - 3 of the Soil Veg database. Also contains associat
Temporary Places
Layers
View: Core
Primary Database
Terrain
Geographic Web
roads
Traffic
Weather
3D Buildings
Borders and Labels
Gallery
Global Awareness
Places of Interest
More
1000294 acres
CA071
CA004
CA079
CA075
CA962
CA076
CA960
CA036
CA056
CA078
CA007
CA029
CA194
CA012
CA009
CA014
©2007 Google
Pointer lat 41.392571° lon -122.401294° elev 4006 ft Streaming 100%
Eye alt 26.07 mi


CA962
CA076
CA962
CA078
CA079
97
CA056
CA007
5
CA194
CA962

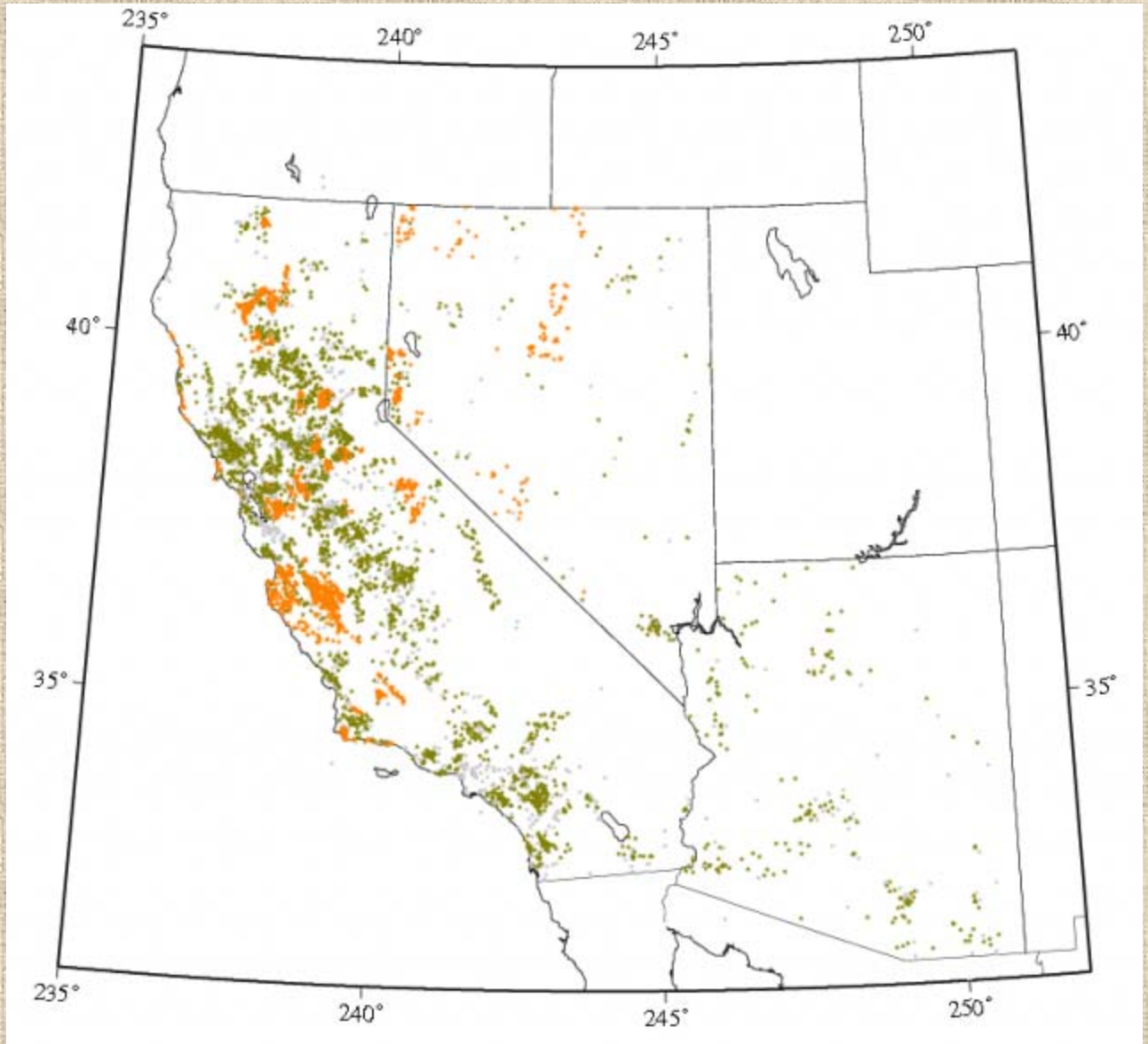
Heat map of users



World distribution of users



Where the polygons exist that are being queried



Tool to assess where to start the update

Last park and last slide

Park 6

Thank you!